

Remarks:

General:

The Applicant has amended the title, specification, claims, and abstract of Patent Application Number 09/784,773 to conform with the Office Action mailed April 2, 2002, and with the Office Action mailed August 7, 2002 and with the Office Action mailed September 20, 2002 and with the Office Action mailed September 2, 2003 and with the Office Action mailed December 5, 2003.

The elements presented in this Amendment E are a clarification and expansion of intent and concepts presented in the original application and references (original and O.A.) and do not, in the view of the Applicant, constitute "new" technical material.

The term "LASER PULSE IMAGE SWITCHES" is descriptive and not intended to be restrictive. A "laser pulse alphanumeric image switch" would also be a "laser pulse image switch". Static, laser pulse image switches would have unchanging symbols or scenes on the switching elements. Dynamic, laser pulse image switches would have the ability to change the symbols or scenes on the switching elements.

Current optronic/photonic system laser technology employs lasers with a wavelength of approximately 1.5 microns (10<sup>-6</sup> meters). This would be the lower limit of laser pulse image switch resolution using current technology, i.e. information symbols or scenes on laser pulse image switch elements would be about 1.5 microns or larger in size.

In a manner of speaking, motion picture projectors, still-slide projectors, TVs, displays (real/virtual), and the like, are image switching devices. These images can range from very large ( I-Max) to very small (microdot). These projectors/screens can range from centimeters to meters in size.

In the Applicant's opinion, laser pulse image switching devices based on MEMS switches and laser arrays and the like (and the technology involved) are unique and novel devices.

These images would be machine operable and would likely need to be enlarged several times to be human observable.

A switch is commonly defined to have two possible states, either on or off. Laser pulse image switches expand the envelope of switch definitions. The laser pulse image switch embodiment described in "Objects and Advantages", with 256 switch elements would have 256 possible single states, or, if combinations are allowed, the possible number of states becomes very, very large. Such a device might be named an "optitch", for optical image switch.

References:

The red, blue and green color switching disclosed by Sakuma et al., U.S. Patent 6,292,305 B1, column 21, lines 3 - 64 et al., to create the illusion of a color image, does not appear to anticipate "LASER PULSE IMAGE SWITCHES".

Tanaka et al., U.S. Patent 5,754,712 column 8, lines 37, 50 - 67 et al., apparently describes binary, on/off, switches and does not appear to anticipate "LASER PULSE IMAGE SWITCHES".

"The scanning device ... having characteristic dimensions on the submillimeter range." disclosed by Johnson, U.S. Patent 5,673,139, Fig. 1, Fig. 2 and Fig. 20 -25 does not show any attempt or concept to create, form, or etch information symbols or scenes onto the optical surfaces i.e. switch elements; and does not appear to anticipate "LASER PULSE IMAGE SWITCHES".

"LASER PULSE IMAGE SWITCHES" and the referenced articles and patents appear to describe all of the elements necessary to develop prototype information systems/networks of laser pulse image optronic/photonic devices.

The potential increase of information transfer rates by laser pulse image switches in optronic/photonic devices and/or systems/networks over binary code systems/networks would seem to make laser pulse image switch based optronic/photonic devices and/or systems/networks useful.

The US Patent 5,673,139 to Johnson does not describe, or show any concept of etching information symbols or scenes on/in the optical surface(s) of the device. The Johnson patent does not contain the terms: "laser pulse image(s)" or "image switches" or "laser pulse image switches". The Johnson patent does not contain the terms: "optronic-photonic devices, systems or networks".

The Applicant respectfully requests reassessment of last line on page 3 plus the first two lines on page 4 of the Office Action dated September 20, 2002. " ... the Johnson reference ... explicitly discloses a submillimeter image switching device in the abstract, lines 3-4, Figs 19a and 19b." The Applicant respectfully asserts that the Johnson reference (abstract, lines 3-4, Figs. 19a and 19b) discloses " The scanning device ... having characteristic dimensions in the submillimeter range." and that raster scanning by a scanning device with submillimeter dimensions does not anticipate;

discrete, separate, laser light pulse images with a predetermined duration (femtosecond) and a predetermined size and the like.

Also, Figs. 19a, 19b and Figs. 20-25 do not anticipate or show any concept of creating or etching information symbols or scenes onto or into the optical surfaces of the Johnson device.

**Response to Office Action of December 5, 2003.**

Note: No drawings were filed with this application (09/784,773).

In the Applicant's opinion, Item 10 of the Office Action (OA)

Summary, page 1, is not relevant.

The OA continues:

Page 2, items 1-2, "Claims 5-9 are rejected under 35 U.S.C. 112 ... Deletion of the new matter is required." Claims 5-9 have been canceled. New Claims 33-52 have been written to comply with this rejection. The required matter plus has been deleted. The Applicant respectfully requests reconsideration and withdrawal of this rejection.

Page 3, items 3-4, "Claims 5-9 are rejected ... as being anticipated by Sullivan et al., U.S.P. No, 6,466,185."

Claims 5-9 have been canceled. New Claims 33-52 have been written to comply with this rejection. The present invention has been more closely defined. The Applicant respectfully requests reconsideration and withdrawal of this rejection.

The referenced patents; Sullivan et al., U.S. Patent# 6,466,185 B2; Takeda et al., U.S. Patent#6,198,566, B1; Barrett et al., U.S. Patent#6,005,990; and Buttner, U.S. Patent#5,936,759; are discussed in the Background section, pages 9-15.

Additional comments to the Sullivan et al. Patent # 6,466,185 B2; Note in Fig. 1, et al., many devices, 9-10, are involved in the Sullivan et al. "...System...".

In embodiments, of the present invention, with symbols in/on MEMS mirrors, the number of devices is two; a MEMS laser pulse image switch and a laser source. In embodiments, of the present invention, with symbol images integral with emitted laser pulses, the number of devices is one; a laser pulse image switch. Support for "symbols on exit mirrors of lasers" is in the last two lines of page 2 of original application, February 15, 2001.

The single photon detector (IDS), could likely demonstrate single (one) photon images, for example; a period. .

The Applicant understands that "metamaterials" (IDS) have a negative index of refraction, and could become enhancement/enabling materials when synergistic with the present invention.



COMMENTS:

Another perspective; most of the devices of the referenced patents apparently require an image-input signal in the form of binary code, "LASER PULSE IMAGE SWITCHES" could create an output image signal of strings of very short laser pulses, small enough to be carried on optical fibers. Each laser pulse being a discrete, separate, image of information symbols or scenes. The referenced devices could likely be converted or adapted to handle the laser pulse image string as input, thereby becoming synergistic with this invention.

This invention presents information symbols or scenes in the form of laser pulse images, with predetermined durations, and with predetermined dimensions. There are likely many ways to create and manipulate these laser pulse images of information symbols or scenes. Hybrid devices, using binary code and laser pulse images synergistically, will likely have a place in the evolution of this paradigm.

This invention describes information symbols or scenes  
in the form of short duration laser pulse images.

This is a unique paradigm compared to the  
traditional methods of information symbols or scenes in the form  
of binary code.

Comment: The Applicant wishes to convey appreciation and gratitude to the Examiner for diligence and assistance. Thank You!

Conclusion:

In the view of the Applicant, the above Amendment E in Patent Application Number 09/784,773 conforms to the 2002, April 2 Office Action and to the 2002, August 7 Office Action and to the 2002, September 20 Office Action and to the 2003, September 2 Office Action and to the 2003, December 5 Office Action.

Request For Constructive Assistance:

The Applicant requests, with all due respect, the assistance and suggestions of the Examiner, pursuant to M.P.E.P. | 2173.02 and | 707.07(j), to place this Application (# 09/784,773) in allowance.

Very Respectfully:

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Certificate of Mailing

I hereby certify that this Amendment E in Patent

Application Number 09/784,773 will

be deposited with the U.S. Postal Service by Express Mail, in an

envelope addressed to "Mail Stop Non-Fee Amendments, Commissioner

for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" on the date below.

Date: Feb. 9, 2004

Inventor's Signature: Joseph D. Udy